THURSDAY, MARCH 6, 1873

HARVESTING ANTS AND TRAP-DOOR SPIDERS

Harvesting Ants and Trap-Door Spiders. Notes and Observations on their Habits and Dwellings. By J. Traherne Moggridge, F.L.S. (L. Reeve and Co., 1873.)

THIS beautifully illustrated little book is a good example of what can be done by a careful observer in a very short time. It might have been thought that the habits of European insects were pretty well known, and that a person comparatively new to the subject could not hope to add much to our knowledge. But the fact is quite otherwise, for Mr. Moggridge, in the course of a few winters spent in the south of Europe has, by careful observation, thrown considerable light on the habits and economy of two important groups of insects, and, as regards one of them, has disproved the dogmatic assertions of several eminent entomologists. Nothing is more curious than the pertinacity with which scientific men will often draw general conclusions from their own special observations, and then use these conclusions to set aside the observations of other men. Mr. Moggridge now confirms, in many of their minutest details, the accounts given by classical writers of the habits of ants. These habits were recorded with so much appearance of minute observation, that they bear the impress of accuracy; yet because the Ants of England and of Central Europe have different habits, it was concluded that the old authors invented all these details, and that they were at once accepted as truths and became embodied in the familiar sayings of the time. The ants were described as ascending the stalks of cereals and gnawing off the grains, while others below detached the seed from the chaff and carried it home; as gnawing off the radicle to prevent germination, and spreading their stores in the sun to dry after wet weather. Latreille, Huber, Kirby, Blanchard, and many less eminent authors, treat these statements with contempt, and give reasons why they cannot be true for European species, yet we here find them verified in every detail by observations at Mentone and other places on the shores of the Mediterranean. Mr. Moggridge has, however, supplemented these observations by discovering the granaries in which they are stored (sometimes excavated in solid rock), of which accurate plans are given. He has seen them in the act of collecting seeds, and has traced seeds to the granaries, from which all husks and refuse are carefully carried away; he has seen them bring out the grains to dry after rain, and nibble off the radicle from those which were germinating; lastly, he has seen them (in confinement) feed on the seeds so collected. A very curious point is, that the collections of seeds, although stored in very damp situations, very rarely germinate; yet nothing has been done to deprive them of vitality, for on being sown they grow vigorously. The species of harvesting ants observed were, *Pheidole megacephala*, *Atta structor*, *A. barbara*, and a larger and differently coloured variety of the last. *Atta structor* is found over a large part of Central Europe, yet, as it has never been observed to lay up stores of seeds in more northern countries, it either has different habits according to locality, or local observers have strangely overlooked its peculiarities. The seeds of more than thirty species of plants were found stored up, none of which were cereals; but at Hyères, M. Germain St. Pierre has observed these latter stored by ants in such quantities that he thinks their depredations must cause serious loss to cultivators. Thus we have another important confirmation of the statements of the old writers.

The second part of the book gives a very interesting and elaborate account of the curious nests of the Trap-Door spiders of the south of Europe, of which two new forms are described, one of them being constructed by a hitherto undescribed species of spider. The nests previously known have a hinged door at the upper end of the tubular nest, but Mr. Moggridge found another kind with a second door lower down, and also one with a lateral chamber the opening to which, as well as the main tube, is closed by the second door. In these nests the lower door is strong and fits closely, and can be held fast by the spider on the inside, while the upper door is for concealment only, being very thin, but almost always closely resembling the surrounding surface. In many cases it is overgrown with living moss and lichens, and Mr. Moggridge thinks that the spider plants or sows the mosses, having found little bits of moss stuck on to a newly-made door. A curious and instructive observation occurs as to the simple manner in which a protective adaptation may be brought about unconsciously. Having cut away the top of one of these nests and thus left the tube exposed on a surface of bare earth, the spider made a new door in which it stuck pieces of moss from the neighbouring moss-covered bank, thus making its nest very conspicuous by the round patch of green on a surface of fresh earth. The simple and natural habit of covering the door of the nest with any material that grows or lies around it usually leads to concealment, but the above example shows that in doing so the insect does not consciously work with this object. Even more curious is the fact that little spiders only a few days old construct nests exactly like those of the parent—tubes excavated in the earth, lined with silk and provided with one or two doors and lateral passages, as the case may be, but only about one-sixth the size. Good reasons are given for believing that these small nests are not abandoned, but enlarged from time to time as the occupant grows bigger. Whether the very young spiders build their nests independently of all teaching or experience is a curious point of inquiry to which our author adverts, and as he suggests that it might not be very difficult to rear young spiders from the egg and place them in conditions favourable for their existence, it is to be hoped that he will try the experiment and help to throw light on a subject on which we have so little positive knowledge.

The numerous coloured plates, giving full-sized representations of the spiders and their habitations, are very carefully drawn, and add greatly to the interest of one of the most original and entertaining books on natural history we have met with for some.

ALFRED R. WALLACE

SEPULCHRAL MONUMENTS OF CORNWALL

Nænia Cornubiæ. A descriptive essay, illustrative of the Sepulchres and Funereal Customs of the early Inhabitants of Cornwall. By W. Copeland Borlase, B.A., F.S.A. (London: Longmans; Truro: Netherton, 1872.)

MEETING with a recent work on any branch of the antiquities of Cornwall, by an author bearing the name of Borlase, is so much like falling in with the ancient landmarks, after having long failed to detect them, as to be in itself a source of pleasure; and this is enhanced on learning that the author of the work before us is not only a namesake, but a great-grandson of Dr. Borlase, the author of "Observations on the Antiquities, Historical and Monumental, of the County of Cornwall," published at Oxford in 1753.

Whilst we have read the book with much pleasure, we have now and then had to regret a lack of distinct method, a tendency to digress, and a tone somewhat too judicial when dealing with questions on which the author differs from older and more experienced antiquaries. As we learn from the Dedication that the author is young, we have little or no doubt that such blemishes will be less conspicuous in the "second series" he contemplates, and which we hope to see at no distant period.

He declines to accept "the hypothetical distinctions drawn between stone, bronze, and iron periods," on account of a few facts he has met with, but which do not appear to contain any danger to the distinctions in question. He lays down the excellent law that the antiquary "should never be ready to sacrifice a fact merely because it is hard to explain, upon the altar of a much more indefensible theory," and soon after reminds us of the well-known maxim—"Do as I say, not as I do;" for when mentioning two instances of graves in each of which, he says, "the monument has consisted of two pillars of unhewn granite, placed at no great distance apart," he adds that "Graves adorned in this manner are the common property of all ages and all religions," and then slides into an attempt to make Homer support the converse proposition—that such pillars are to be always regarded as indications of a grave. For this purpose he quotes the *Iliad*, xxxiii. 329, and gives the following as Mr. Wright's translation:—

> "On either side
> Rise two white stones, set there
> To mark the tomb of some one long since dead."

We are afraid that Mr. Borlase has here been willing to sacrifice a *fact* rather than his *theory*. The passage in Homer and its bearing on the question had been previously mentioned by Sir John Lubbock,* who also uses Wright's translation. At the burial of Patroclus, Nestor, pointing out to his son the course for the chariot race, says:—

> "Plain is the goal
> That now I tell thee of; nor canst thou miss it—
> Upraised four cubits high above the ground
> There stands a wizen stump, of oak or pine,
> Not rotted by the rain. On either side—
> Where narrowest is the way, and all the course
> Around is smooth—rise two white stones, set there
> To mark the tomb of some one long since dead,
> Or form the goal for men in ages past,
> But now the goal of Peleus' god-like son."

It is obvious, from the last line but one, that Homer was by no means certain that such stones invariably marked a grave.

Having pointed out the few defects of the book which struck us, we now proceed to the more agreeable duty of giving a brief summary of its contents.

Mr. Borlase rejects unconditionally the hypothesis that the megalithic remains in Cornwall are druidical. To Sir J. Lubbock's remark that "A complete burial place may be described as a dolmen, covered by a tumulus, and surrounded by a stone circle; often, however, we have only the tumulus, sometimes only the dolmen, and sometimes only the circle," he proposes to add, "sometimes only two adjacent menhirs, and sometimes only the single standing stone," and states that "under the one or the other head may be classed every mode of interment hitherto discovered in Cornwall."

He divides European Cromlechs into three classes: 1. The Dolmen, or "table-stone" proper, where the vertical supports do not *enclose* a space, or form a continuous wall. 2. The Larger Kist-Vaen, or stone chest, where the vertical supports and the covering stone form an enclosed chamber, designed to hold the body, and covered, sometimes very slightly, with a mound. 3. Monuments similar in structure to the Kist-Vaen just described; but instead of receiving the body are merely cenotaphs raised over the actual grave. There is in Cornwall no instance of the third class.

The first, or dolmen, is much higher than the others, and is comparatively rare, there being but two examples in the county. Lanyon Cromlech, in the parish of Madron, near Penzance, consists entirely of granite, and was described by Dr. Borlase. It fell in 1815, and was set up again in 1824, but some of the stones had been broken. The covering stone, or quoit as it is termed in Cornwall, measured 47 ft. in circumference, and averaged 20 in. in thickness. It was supported by three thin unhewn pillars, at a height sufficient to permit a man on horseback to sit under it. Caerwynen Cromlech, near Camborne, resembles that just described in construction and material. The quoit measures 12·75 ft., and its three supporters varied from 5·17 ft. to 4·9 ft. high. This monument has also fallen and been replaced. A simple, but unoccupied, grave cut in the soil was found under the quoit at Lanyon, but it does not appear that any search has been made at Caerwynen.

Of the second class of cromlechs, or larger kist-vaens, Mr. Borlase describes no fewer than eight examples—five near the western extremity, two near the centre of the northern coast, and one in the south-east of the county; but no more than one in each division is now perfect or approximately so. They all consist of the rock of the district or its vicinity, and six of them are of granite, whilst two are of a "sparry rock." One is in a valley, but at least five occupy conspicuous positions on high ground. There are distinct indications that several of them were covered with a barrow of earth or stones, and one, Lower Lanyon Cromlech, was so covered when it was found. The author claims for the Chywoone or Chûn Cromlech, in the parish of Morvah, near Penzance, the distinction of being the most perfect and compact now in the county, and ventures on the following speculation respecting the process of its erection:—The east and west ends, each 6·3 ft. high and 3·9 ft. and 4 ft. broad respectively, were first set up 6 ft. apart. Against their western edges a flat block of granite, 8·3 ft. long, was placed in a slanting position. On this northern side, probably over this sloping stone, with the assistance of an embankment and rollers, a rough slab of hard-grained granite, convex on one side, 12 ft. in length and breadth, and from 14 in. to 2 ft. in thickness, was raised as the covering-stone.

---

* "Prehistoric Times," 2nd edition, 1869, pp. 109, 110.

Finally a stone 7·67 ft. long, but not high enough to reach the covering stone, was placed on the south side. The chamber is 7 ft. high within, and a small pit seems to have been sunk in the natural soil at the centre. The pile is surrounded, and was probably covered, with a barrow, which still in some places nearly reaches the top of the side stones. It measures 32 ft. in diameter and is surrounded with upright stones. The interstices between the sides of the chamber were filled with small stones, calculated to prevent the entrance of any rubbish.

The Pawton Cromlech, in the parish of St. Breock, near Wadebridge, occupies high ground, and is intact. The kist, 7·5 ft. long, 2 ft. wide at one end and 3·5 ft. at the other, and at least 5 ft. deep, is formed with eight sparry side-stones, more than half buried in an oval tumulus, 60 ft. long. The quoit, also a sparry stone, supported by only three of the side-stones, is 7 ft. broad, 2·5 ft. thick, and, though a portion of it has been broken off, still 13 ft. long.

Trethevy, or Trevethy, Cromlech, or "Stone," in the parish of St. Cleer, near Liskeard, in south-east Cornwall, is stated by the author to be the largest, though perhaps the least known of the Cornish cromlechs. Nevertheless, he adds that it was described by Norden about 1610, and has been the subject of two papers in the present century. It consists of six upright stones, only three of which support a quoit, 13 ft. long, 9 broad, and 1 thick, which, on account of the unequal heights of its supporters, is 13 ft. above the ground at one point, and not more than 7·5 feet at another. The eastern or principal and highest supporter, rising nearly 10 ft. above the small mound on which the whole stands, has almost the appearance of a wrought stone. A ruder stone, almost equally high, rests against it like a buttress. The two stones on each side of the chamber are several feet shorter. The western end is open, but an eighth stone, considerably longer than the side-stones, lying lengthways along the kist, as if it had fallen there, was probably the supporter of that extremity. The interior of the chamber is from 9 to 10 ft. long, and from 5·5 to 6·5 ft. broad. There is near the bottom of the eastern supporter an aperture 2 ft. high, and 1·75 broad, and in the north-east corner of the quoit, where it extends beyond the kist, a hole not quite circular, from 6 to 8 in. across. Norden speaks of the latter as "an arteficiall holl, which served as it seemeth to put out a staffe, whereof the house itself was not capable." Mr. Pattison, a careful student of the geology and antiquities of Cornwall, also states that "the sides are smooth, as if worn by a staff;" and Mr. Borlase is of opinion that "such is, without doubt, the account of it." If this be so, it apparently indicates that the cromlech, whatever its origin, had not been restricted to funeral uses. The author calls attention to the fact that a hole is frequently found in the dolmens of Eastern Europe and India, adding, however, that this always occurs in one of the sides and communicates with the interior of the chamber, whilst in the Cornish example it passes through an overlapping portion of the quoit. Without expressing an opinion on this question, we would remind those who have "done" Dartmoor that they have probably been taken by the guide to see, lying in some of the streams, blocks of granite having approximately circular smooth holes passing completely through them, and, though there could be no doubt that they were due to the action of running or falling water, have been expected to regard them as somewhat mysterious. Is it not possible that, when choosing their slabs, one which happened to be thus naturally perforated, if suitable in all other respects, would be selected rather than rejected by the cromlech builders? Trethevy Cromlech consists of granite, and Mr. Pattison, quoted by Mr. Borlase, has called attention to the fact that this rock, where nearest the cromlech, occurs as boulders about half a mile distant across a broad upland valley, and adds that "the builders must therefore have credit for the exertion of combined strength and skill in transporting these enormous masses of rock across the hollow and up the hill on which they stand." Though, if necessary, we are quite prepared to concur in this, it must not be forgotten that the agency which lodged boulders on one side of the valley, may perhaps have deposited a few on the other, so that the builders may have found their materials nearer home.

Zennor Cromlech, in the parish of the same name, near St. Ives, now dismantled, was in the time of Dr. Borlase the most interesting and perfect kist-vaen in West Cornwall, and remarkable on account of the extension of the side-stones beyond the eastern end of the chamber, where with the aid of two additional stones, they formed a little cell. Such an addition appears to be unique in Cornwall, but in Wales and Anglesea it seems to be the rule rather than the exception for a small kist-vaen to exist side by side with the large one.

Though there are no *Passage graves* in Cornwall in the sense in which the term is used by Swedish antiquaries, there are several instances of long chambers buried in tumuli, and roofed with large flat stones, and, as in Denmark, termed "Giant's Graves." In 1756 Dr. Borlase described the largest of a group in the island of St. Mary, in Scilly, as 4·5 ft. wide at the mouth, 13·6 ft. long, and 3·6 ft. high, covered from end to end with large flat stones, and having a tumulus of rubbish on top of all.

The largest of a group of three in the parish of Zennor was described and figured in the *Gentleman's Magazine*, July 1865, by Mr. J. T. Blight, who stated that its direction was from N.W. to S.E., and that its dimensions were 9·5 ft. long, 4 ft. wide, and 4·3 ft. high. The roofing slabs, like those in St. Mary's, were of granite; the first, being 6 in. lower than the others, appeared to be designed as a lintel, and made the clear height beneath it no more than 3·5 ft.. The walls were of neat masonry, similar to the hedging work still in use in the neighbourhood; and the whole was covered with a tumulus 70 ft. in circumference, 8 ft. high, and built round at its base with large stones.

Near the village of Castle Euny, in the parish of Sancreed, near Penzance, Mr. Borlase discovered a chambered tumulus in April 1863, in a valley long known to be rich in ancient remains. The tumulus is conical, 8 ft. high and 50 ft. in circumference, and supported at the base with large granite stones, one rising 4 ft. above the ground. The Chamber is 6 ft. long, 3 ft. broad at the entrance and 3·75 at the opposite or northern end, and 3·5 ft. high. Each side and end consists of a single block of granite resting on an artificial elevation 2 ft. high, and the roof is formed of two stones. Though probably the most perfect barrow of its kind in the west of England, it was used by the farmer as a shelter for sheep or pigs, but it is not known when it was opened.

(*To be continued.*)

OUR BOOK SHELF

The Useful Plants of India, with Notices of their chief Value in Commerce, Medicine, and the Arts. By Col. Heber Drury. Third edition, with Additions and Corrections. (W. H. Allen and Co., 1873.)

The first edition of this useful work was published in 1858, since which period our knowledge of the economical products of our vast Indian possessions has greatly increased; and we have here an enumeration of 600 herbs or trees from which more or less valuable substances are obtained. The species are aranged in alphabetical order, the natural order and native and English names of each are given, followed by a description, and an account of its economic uses, taken from various standard works, or from the author's own observation. The list is not confined to natives of the country, but includes also such introduced plants as are largely cultivated and of great economic importance, as cinchona, tea, cacao, tobacco, and the Australian eucalyptus, now so extensively planted to replace the forests which have been destroyed in many parts of the peninsula to the great deterioration of the climate. In an appendix are statistics of the cultivation of cinchona, indigo, tea, and some of the fragrant woods, a table of exports and their value, and lists of synonyms in the Hindostanee, Bengalee, Tamil, Teloogoo, and Malayalam languages. The technical descriptions, and other details, have been worked out with great care, and with abundant reference to original authorities, as far as was possible to any one undertaking a work of this description at Trevandrum, and without access to the libraries and herbaria which are at the command of students in this country. Col. Drury has, however, obtained the assistance of Dr. Hugh Cleghorn, and other practical botanists, and his work is one that can be fully relied on as giving an accurate and nearly exhaustive account of the economical productions of our Indian empire.

A. W. B.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.*]

External Perception in Horses

May I be allowed to express my entire agreement with the theory about smell in dogs, brought forward by Mr. Wallace and Mr. Croom Robertson. The latter gentleman's arguments, in your last number, seem to me as sound in fact as they are metaphysically acute.

May I assure him, from long observation, that horses and donkeys "think with their noses" as certainly, though not, I believe, as acutely or as continuously as dogs do. But the eye-memory of a horse seems to me so much more exercised than his nose-memory, that he is, perhaps more able, when lost, to find his way home than is the dog, who has smelt everything, but looked at very little.

C. Kingsley

Feb. 28

External Perception in Dogs

Mr. G. Croom Robertson's and Mr. Alfred W. Bennett's observations may be easily tested by the cases of blind dogs. A blind dog in my house finds her way about as truly as a sighted dog, so that a stranger on seeing her would not be aware of her blindness. As she lost her sight by illness, she has of course the precedent knowledge derived from seeing.

To a considerable extent this case answers Mr. Bennett's requirements.

Hyde Clarke

St. George's Square, March 1

Mr. Wallace on Instinct

In reference to the letters of Mr. Darwin and Mr. Wallace, the following passage from Boswell's Life of Johnson may be worth recalling:—

"The custom of eating dogs at Otaheite being mentioned, Goldsmith observed that this was also a custom in China; that a dog-butcher there is as common as any other butcher; and that when he walks abroad, all the dogs fall on him. Johnson.—'That is not owing to his killing dogs, sir. I remember a butcher at Lichfield, whom a dog, that was in the house where I lived, always attacked. It is the smell of carnage which provokes this, let the animals he has killed be what they may.' Goldsmith.—'Yes; there is a general abhorrence in animals at the signs of massacre. If you put a tub full of blood into a stable, the horses are like to go mad.'" (Croker's Ed., vol. iii. p. 275.)

W. R. Nicoll

Aberdeen

Effect of Light on the Electric Conductivity of Selenium

It is of course impossible not to feel intense interest in the statement (Nature, vol. vii. p. 303) which Mr. Willoughby Smith makes and which Mr. Latimer Clark endorses. That I have been unable to obtain the same result has doubtless been due to my having worked under conditions different from those existing in Mr. Smith's experiments. My failure has not been one of degree, but has been absolute. I have not only been unable to find that light increases the electric conductivity of selenium, but I have failed to get a current through selenium at all, even through a thickness of 0·1 millimetre. As I do not know how to put myself at once in direct communication with Mr. Smith, perhaps you will permit me to ask him through your columns to guide me on the following points:—

(*a.*) What was the form of battery employed, and what its power of overcoming British Association units of resistance?

(*b.*) What was the molecular condition of the "metal" (*sic*) employed,—*vitreous* or *crystalline*?

(*c.*) Where can "bars" of selenium be obtained which will afford the results stated?

(*d.*) Are there any unstated conditions essential to the successful production of the phenomenon?

Harry Napier Draper

In the description given in Nature of February 20 last, of the very remarkable variations in the electrical resistance of bars of selenium due to the action of light, no detail is given to show how such an excessively high resistance as 1400 megohms is measured.

I am anxious to repeat the investigation of this very interesting, and as far as I know, wholly unexpected property of selenium, my idea being to measure the resistance of the bars when exposed to the light of the solar spectrum, noting the position in which the effect is at a maximum, and the extent to which the resistance is affected in the different parts of the spectrum.

But before I can do this I must be able to measure these enormously high resistances satisfactorily, and I would therefore ask if you or any of your readers would tell me how I am to do this, using resistance coils up to 60,000 B.A.U., and a reflecting galvanometer with a resistance of 1,200 B.A.U.

M. L. Sale

Brompton Barracks

The Zodiacal Light

Since I last wrote upon this subject my views have been strongly confirmed. Both branches of the zodiacal light have been visible for some time past, and it is either getting brighter, or four months' continual practice enables me to detect its presence under unfavourable circumstances much more readily.

The night of January 30 was wonderfully fine; the ground of the heavens was intensely black, and the Milky Way was simply one blaze of light from the zenith to the very horizon: only on such nights as these are observations of the zodiacal light worth recording; all others must be very imperfect.

That night the western branch was very distinct from the horizon up to the Hyades in Taurus; at this point its breadth was much greater than on November 27 ult.; here it probably crossed first the branch of the Milky Way which tends towards Orion, then the Milky Way itself, and so was not visible for about 40° on the Ecliptic; but it became visible again in Gemini, though very faint, and it did not quite reach Præsepe in Cancer.